Model 39c

DESCRIPTIVE MODEL OF SHORELINE PLACER Ti

By Eric R. Force

DESCRIPTION Ilmenite and other heavy minerals concentrated by beach processes and enriched by weathering.

GENERAL REFERENCE Force (1976).

GEOLOGICAL ENVIRONMENT

Rock Types Well-sorted medium- to fine-grained sand in dune, beach, and inlet deposits commonly overlying shallow marine deposits.

Age Range Commonly Miocene to Holocene, but may be any age.

Depositional Environment Stable coastal region receiving sediment from deeply weathered metamorphic terranes of sillimanite or higher grade.

Tectonic Setting(s) Margin of craton. Crustal stability during deposition and preservation of deposits.

DEPOSIT DESCRIPTION

Mineralogy Altered (low Fe) ilmenite ± rutile ± zircon. Trace of monazite, magnetite, and pyroxene; amphibole rare or absent. Quartz greatly exceeds feldspar.

Texture/Structure Elongate “shoestring” ore bodies parallel to coastal dunes and beaches.

Ore Controls High-grade metamorphic source; stable coastline with efficient sorting and winnowing; weathering of beach deposits.

Weathering Leaching of Fe from ilmenite and destruction of labile heavy minerals results in residual enrichment of deposits.

Geochemical and Geophysical Signature High Ti, Zr, REE, Th and U. Gamma radiometric anomalies resulting from monazite content. Induced-polarization anomalies from ilmenite.

EXAMPLES

Green Cove Springs, USFL	(Pirkle and others, 1974)
Trail Ridge, USFL	(Pirkle and Yoho, 1970)
Lakehurst, USNJ	(Markiewicz, 1969)
Eneabba, AUWA	(Lissiman and Oxenford, 1973)

GRADE AND TONNAGE MODEL OF SHORELINE PLACER Ti

By Emil D. Attanasi and John H. DeYoung, Jr.

COMMENTS Grade and tonnage estimates represent mining units rather than individual lenses. Grades are represented as percent TiO_2 from rutile, ilmenite, leucoxene, percent ZrO_2 from zircon, and percent rare-earth oxides from monazite. Zircon is correlated with rutile (r = 0.49, n = 50), ilmenite (r = 0.58, n = 52), leucoxene (r = 0.55, n = 24), and monazite (r . 0.55, n = 29). Ilmenite is correlated with leucoxene (r = 0.66, n = 24) and with monazite (r = 0.66, n = 29). See figs. 201-205.

DEPOSITS

Name	Country	Name	Country
Agnes Waters	AUQL	Boulougne-Folkston	USFL
Barrytown	NZLD	Bridge Hill Ridge	AUNS
Birchfield	NZLD	Brunswick-Altamaha	USGA
Bothaville-Wolmaransstad	SAFR	Camaratuba	BRZL
		Capel Shoreline	AUWA

Carolina	SAFR
Charleston-B	USSC
Charleston-C	USSC
Charleston-I	USSC
Charleston-K	USSC
Charleston-L	USSC
Charleston-N	USSC
Cumberland Island	USGA
Curtis Island	AUQL
East Rosetta	EGPT
Eneabba Shoreline	AUWA
Evans Head-Wooli area	AUNS
Fraser Island	AUQL
Gingin Shoreline	AUWA
Gladstone Mainland	AUQL
Green Cove Springs	USFL
Highland-Trail Ridge	USFL
Hilton Head Island	USSC
Hokitika North	NZLD
Hokitika South	NZLD
Inskip Point (Cooloola area)	AUQL
Jacksonville Area	USFL
Karamea	NZLD
Lakehurst (Glidden)	USNJ
Manavalakurichi	INDA
Manchester (Asarco)	USNJ
Moreton Island	AUQL
Munbinea Shoreland	AUWA
Munmorah	AUNS
Muriwai	NZLD
N.L. Industries (Aurora)	USNC
N. Stradbroke Island	AUQL
Natchez Trace State Park	USTN
North Camden (Keer-McGee)	USTN
Oak Grove (Ethyl)	USTN
Orissa (Chatrapur)	INDA
Poerua River	NZLD
Pulmoddai	SRIL
Quilon (Chavara)	INDA
Richards Bay	SAFR
Ross	NZLD
Scott River	AUWA
Ship Island	USMS
Silica Mine	USTN
Stockton Bight	AUNS
Tuncurry-Tomago area	AUNS
Waiho River	NZLD
Waroona Shoreline	AUWA
Westport	NZLD
Yoganup Shoreline	AUWA
Yulee	USFL

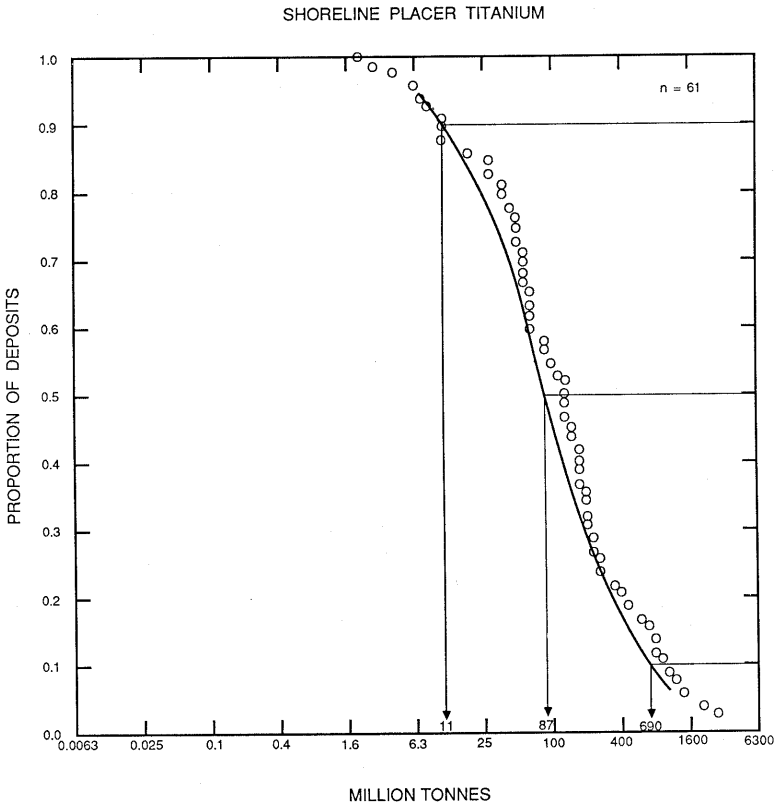

Figure 201. Tonnages of shoreline placer Ti deposits.

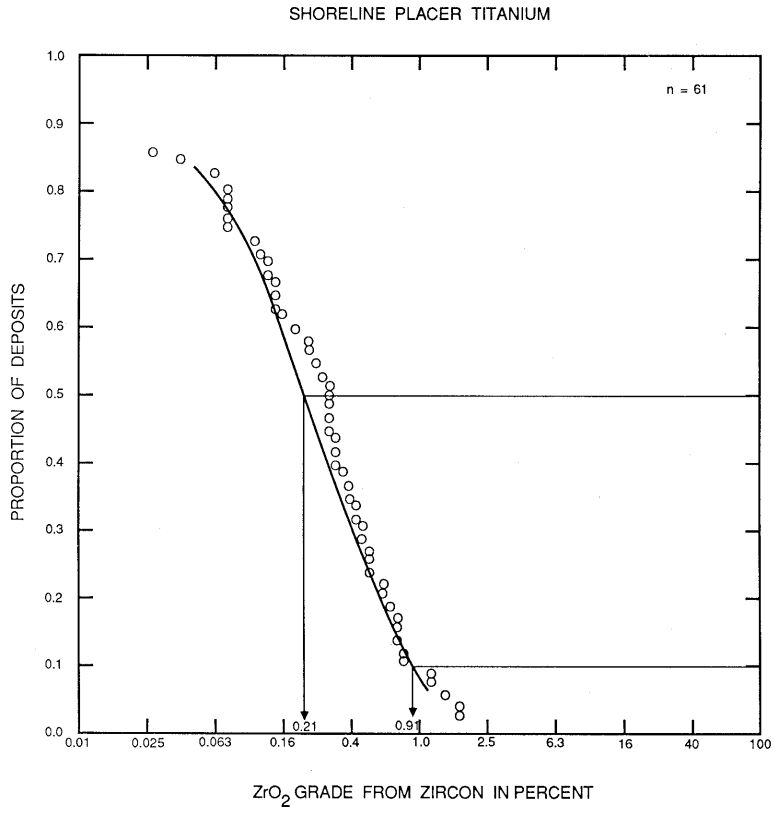

Figure 202. ZrO_2 grades from zircon in shoreline placer Ti deposits.

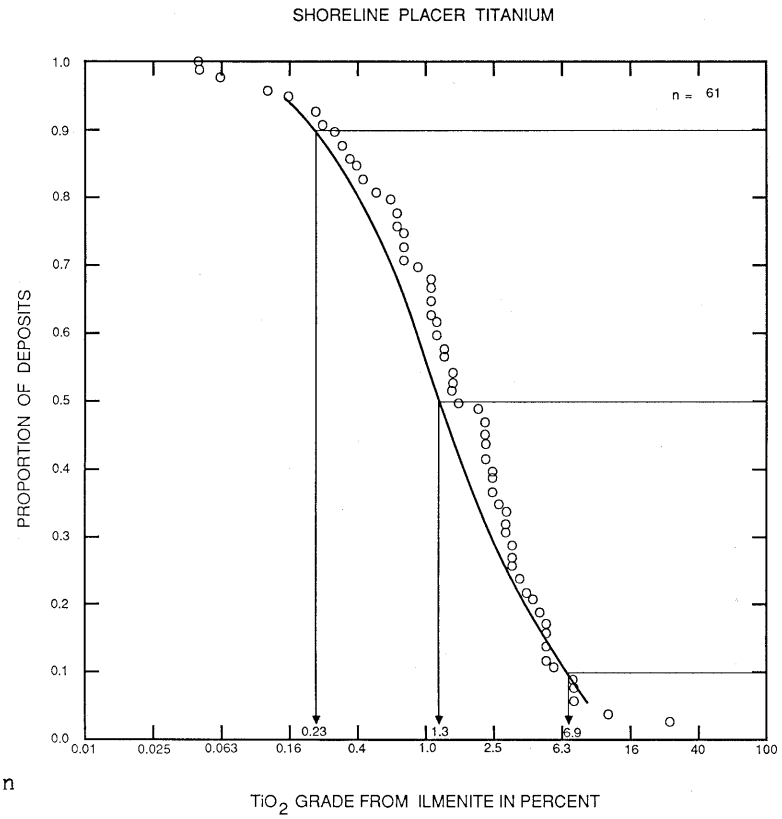

Figure 203. TiO_2 grades from ilmenite in shoreline placer Ti deposits.

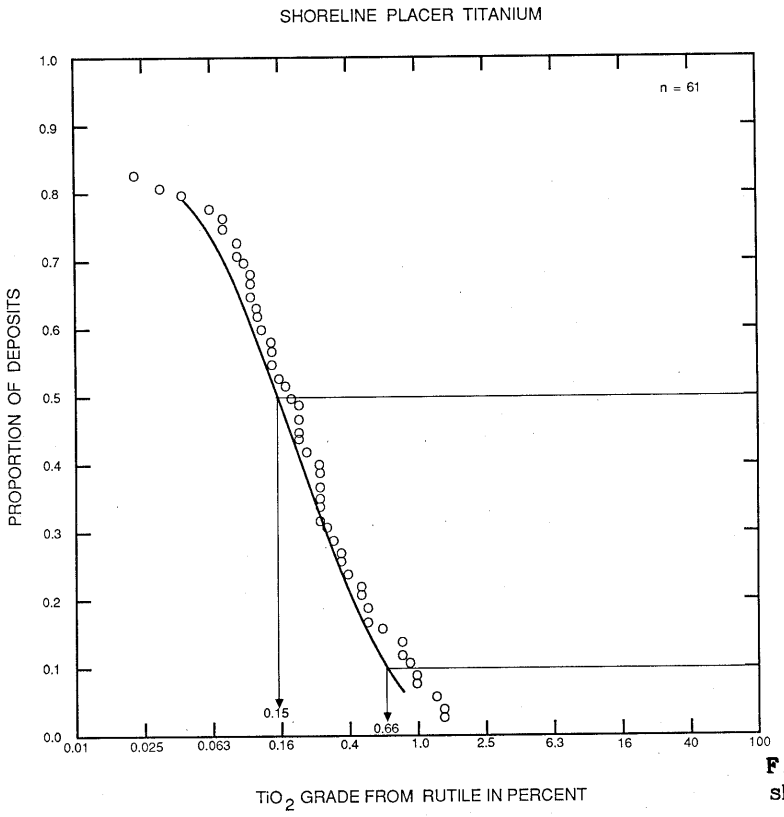

Figure 204. TiO_2 grades from rutile in shoreline placer Ti deposits.

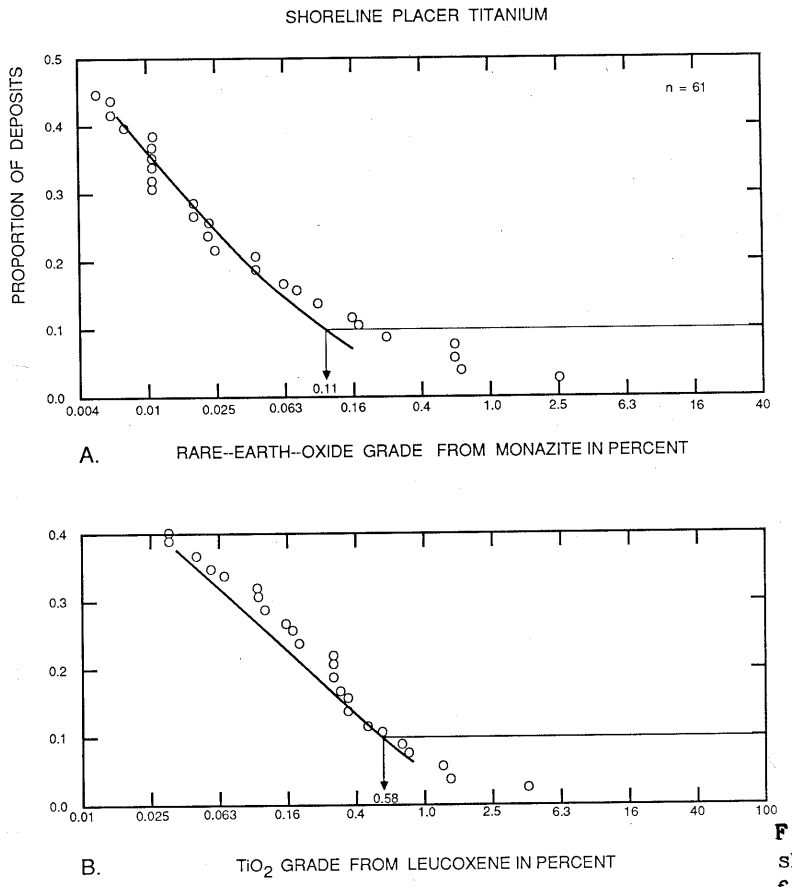

Figure 205. Other metal grades of shoreline placer Ti deposits. A, REE oxide from monazite. B, TiO_2 from leucoxene.